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31 MAR 1970

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MEMORANDUM FOR: Director, National Photographic Interpretation Center

SUBJECT : Request for Approval to Expend [redacted] from FY-1970 Funds for a Ground Order-of-Battle Resolution Study Contract with [redacted]

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1. This memorandum requests approval for the commitment of funds for a contract. The specific request is contained in paragraph 7.

2. Image quality requirements for satellite reconnaissance systems exert a major influence on the costs of such systems. The more stringent the specifications, the higher the development and production costs. Photographic ground resolution is a primary image quality variable affecting intelligence extraction from reconnaissance exploitation. Empirical determination of information yield as a function of improving image resolution can provide a critical input to objective acquisition system design. Through the use of controlled imagery, simulating potential optical system capabilities, resolution break points may be established for specific targets. These cutoffs, beyond which no further useful intelligence information can be extracted from photography, act as guidelines to collection planners who are thus able to compare intelligence requirements on one hand with attendant system parameters and costs on the other. Conversely, once the parameters of a new reconnaissance system have been designated, those requirements that the system can be expected to fulfill may be compiled objectively by empirical investigations of PI output as a function of anticipated image quality. Results of such studies must be target specific, since interpretation of targets consisting of large components usually can be accomplished with poorer ground resolution than that required for targets containing small components. Furthermore, usable results must be specific to particular PI functions. Mere target identification as the interpreter's goal can generally be achieved with poorer image quality than that needed for detailed technical analysis of the same target.

Declass Review by NIMA/DOD

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GROUP 1
Excluded from automatic
downgrading and
declassification

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3. The proposed study to be conducted by []

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[] will treat ground order-of-battle (GOB) targets. This object category is of high priority in the Intelligence Community in terms of both current denied area assessment via satellite reconnaissance and future SALT environment inspection capabilities. Previous investigations of intelligence extraction as a function of photographic ground resolution have been conducted for such targets as aircraft, ICBM sites, and mobile radars. The results of these studies have proven to be of great interest and assistance to Community planners. Each study has produced results unique to the specific target under consideration. The radar investigation resulted in an indication of the most stringent ground resolution requirement [] because of the many small electronic components included in the targets. Photo interpretation requirements in the GOB category are becoming increasingly more detailed. It may very well be that future analysis requirements can be met only by ground resolutions even finer than those presently indicated for the electronics targets.

4. Developing data on intelligence extraction in the particular area of ground order-of-battle equipment--as a function of photographic ground resolution--will enable NPIC to respond with greater precision to the needs of collection system designers and resource planners. Such responses, giving proven technical data about the degree and quality of intelligence which could be obtained relevant to various design resolutions, enable better judgments to be made concerning value versus costs of alternative designs and objectives.

[]

The imagery utilized will simulate as closely as practicable the modulation transfer function and scale as well as the resolution of present and proposed acquisition systems. The study will employ NPIC photo interpreters and/or external PI's performing similar GOB analysis functions.

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Final results of the investigation should be available to the Community
[] thus
enabling Center management to make a practical prediction of GOB readout
functional assignments and capabilities []
The study's results will also depict those GOB requirements, if any, which
can be satisfied only with a ground resolution better than that expected
[] The proposed project will consist of two major
phases, data collection and data analysis. A final technical report will
be prepared upon completion of the study. [] is currently under a
separate contract to prepare for the study by executing an experimental
design, by coordinating the acquisition and processing of domestic GOB
imagery and ground truth data, and formatting the required experimental
materials.

6. [] has been chosen to perform the proposed project because of
the contractor's experience gained and competence demonstrated on similar
previous efforts for NPIC. It is deemed inadvisable at this time to re-
quest open bids on such a project due to the absence of any other cleared
contractor well-versed in the extremely specialized nature of the research
involved. Estimated price of the work to be done under this contract is
[] under a separate Time and Materials contract
to NPIC, is assisting [] with several tasks in the current contract. It
is anticipated that [] will continue its support role to the effort
proposed herein, under both FY-70 & FY-71 funds. [] is perform-
ing the image processing portion of this program for approximately []
under PAR 255 of Contract []
of GOB targets is being flown by an OSA/DDS&T aircraft covered by approxi-
mately [] of miscellaneous services funds transferred from NPIC.

7. Successful completion of this contract could lead to further image
quality requirements studies to contribute to NPIC's imagery exploitation
planning. However, additional investigations of photographic ground reso-
lution as a critical variable probably will not be required. Similar studies
employing the simulated products of unconventional sensor systems, such as
line-scan, side-looking radar, or infra-red, are likely future requirements.

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8. The sterility code, [] is appropriate for this work; the
Project Officer will assign security classifications to the reports.

9. It is requested that the negotiation with []
[] for a contract to conduct the program described at a cost
not to exceed [] be approved.

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[]
Chief, Technical Services & Support Group,
NPIC

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Attachments:

1. Proposal
2. Form 242

22 APR 1970

APPROVED: _____

ARTHUR C. LUNDAHL
Director

Date

National Photographic Interpretation Center

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